Amendments to the Specification:

Please replace paragraphs [0025] to [0056] with the following amended paragraphs:

[0025] FIG. 1 shows an example of a instant messaging system. The system essentially consists of ~~instant~~ message brokers 2 connected to client profile databases 3, gateways for e-mail 4, gateways for GSM/SMS 6, gateways for voice mail and facsimile 5 which can communicate with each other by means of a network 1. At least one message processor 7 can process particularly the content of transmitted messages. The ~~instant~~ message broker 2 manages the system configuration and state, user profiles of the client profile database 3, message routing and services, accounting and security.

[0026] FIG. 2 shows the communication structure of a messaging system. A configuration comprises an ~~originator (~~instant message gateway (originator) ~~4)~~, an ~~a receiver (~~instant message gateway (receiver) ~~5)~~ and a message broker 2 as well as additional units. The different units of such a system may be global distributed or located at a single computation node. In the example of FIG. 2 the data flow of such a minimal messaging system is schematically depicted.

[0027] In phase 1 the ~~originator~~ instant message gateway (originator) 4 receives a message from a client (~~i.e.~~ e.g. a facsimile from a PSTN), prepares (extracts) meta information from the message received and sends the meta information to the message broker 2.

[0028] In phase 2 the message broker 2 determines the required message conversion and the message route according to the state of the messaging system and client (sender and receiver)

profiles stored in the connected database 3. Additionally the message broker 2 can prepare message security and also indication. The modified meta information is than returned from the ~~instant~~ message broker 2 to the instant message ~~originator~~ gateway (originator) 4.

[0029] In phase 3 controlled by the meta information the instant message ~~originator~~ gateway (originator) 4 transmits the instant message (consisting of meta information and message content) to the ~~receiver~~instant message gateway (receiver) 5. In case where an additional message service or message conversion is required, the instant message can be routed over a ~~an additional~~ message processor 7.

[0030] In phase 4 the ~~receiver~~instant message gateway (receiver) 5 transmits the (eventually converted) message to the client. After transmission, the ~~receiver~~instant message gateway (receiver) 5 sends an acknowledgement (e.g. delivery, client receipt, or non-delivery) to the message broker 2, wherein the acknowledgement controls the message flow.

[0031] FIG. 3 shows in detail the message and information authentication protocol. At first in a set-up phase one the instant message ~~originator~~ gateway (originator) 4 transmits meta information to the message broker 2, wherein the meta information can be signed.

[0032] In a release phase 2, ~~two~~ the message broker 2 returns transmission management information (signed).

[0033] In a transmission phase three the instant message ~~originator~~ gateway (originator) 4

transmits signed instant message to the ~~receiver~~instant message gateway (receiver) 5 (optionally through message processors 7).

[0034] In an ~~a~~ authentication and accounting phase four the ~~receiver~~instant message gateway (receiver) 5 returns a signed acknowledgement to the message broker 2.

[0035] As reference to FIG. 4, the message transmission according to the present invention will be explained by means of the graphical representation.

[0036] In step S1 the instant message ~~originator~~ gateway (originator) receives a message from a sending client. In a step S2 the instant message ~~originator~~ gateway (originator) extracts meta information by performing a predetermined processing. In a step S3 a communication between the instant message ~~originator~~ gateway (originator) and the message broker is set up and in a step S4 the meta information extracted in step S2 is transmitted. In step S5 the message broker modifies the meta information by using client profile data from connected client profile database. In step S6 the modified meta information (managing information) is transmitted from the message broker to the instant message ~~originator~~ gateway (originator). In step S7 ~~a~~ communication ~~set up~~ between the instant message ~~originator~~ gateway (originator) and a ~~destination~~instant message gateway is effected. In step S8 the message content and the meta information are transmitted from the instant message ~~originator~~ gateway (originator) to the instant message ~~second (destination)~~ gateway (receiver). In step S9 the message is delivered from the ~~destination~~instant message gateway to the target client. In step S10 the ~~destination~~instant message gateway returns a communication acknowledgment ~~gateway~~ to the

message broker. In step S11 the message broker sends an acknowledgement to the ~~originator~~instant message gateway (originator).

[0037] With references to ~~FIG. 4~~ FIGS. 5A through 5D, the message and information authentication protocol will be explained in detail.

[0038] In Fig. 5A, the ~~The originator~~instant message gateway (originator) sends a time ~~synchronised~~ synchronized communication set-up (TSCS) login key to the ~~instant~~ message broker. The communication is set up by the transmission of the TSCS login key C and its digests HMAC (K1, C). The ~~instant~~ message broker checks the TSCS login key and returns a TSCS acknowledgement key containing a session key. The TSCS acknowledgement key containing the randomly generated session key C_{ack} is sent to the instant message gateway (originator). Note that the different session keys are randomly generated and unique for each communication step they are applied in.

[0039] The ~~originator~~instant message gateway (originator) appends the session key to the message and sends an instant message meta information (IMI) signed with the key K1 to the message broker. The instant message meta information (IMI) is transmitted with the appended session key C_{ack} and ist digests HMAC (K1, IMI+ C_{ack}). The message broker checks the instant message meta information (IMI) and inserts and modifies information in the IMI by using user profile tables and database information. The session key is appended to the message. The message is than signed with key K2 and key K1. The broker IMI is transmitted with the broker inner digest ID (corresponding to HMAC (K2, IMI+ C_{ack}). The IMI in the broker digest are

signed again with key K1 (outer digest HMAC (K1, IMI+ C_{ack}+HMAC (K2, IMI+ C_{ack})).

[0040] The ~~originator~~instant message gateway (originator) checks the outer digest and sends an acknowledgement process broker IMI to the message broker.

[0041] In Fig. 5B, ~~Than~~ the ~~originator~~instant message gateway (originator) then set ups a communication by the transmission of the TSCS login key C and its digest HMAC (K1, C) to the instant message gateway ~~(destination)~~ (receiver). The ~~destination~~instant message gateway (receiver) checks the TSCS login key and returns a TSCS acknowledgement key containing a session key. Therefore the TSCS acknowledgement key containing the session key C_{ack} is sent to the ~~originator~~instant message gateway (originator).

[0042] The ~~originator~~instant message gateway (originator) appends the session key to the message and sends an instant message signed with key K1 to the ~~destination~~instant message gateway (receiver). Therefore an instant message (IM) (i.e. message data and IMI) containing the message M is transmitted to the ~~destination~~instant message gateway (receiver).

[0043] The ~~destination~~instant message gateway (receiver) checks the instant message, converts the instant message and sends an acknowledgement which is signed to the ~~originator~~instant message gateway (originator). The session is than finished for the ~~originator~~instant message gateway (originator).

[0044] As shown in Fig. 5C, the ~~The~~ message is ~~than~~ then delivered from the ~~destination~~instant

message gateway (receiver) to the target client (customer).

[0045] The ~~destination~~instant message gateway (receiver) is ~~than~~ then sending a TSCS login key for a communication set-up to the message broker.

[0046] The message broker checks the TSCS login key and returns a TSCS acknowledgement key containing a session key to the ~~destination~~instant message gateway (receiver). In the acknowledgement step the ~~destination~~instant message gateway (receiver) returns the broker ID (generated previously by the message broker) and a message delivery read acknowledgement and signs it with the key K1.

[0047] The ~~destination~~instant message gateway (receiver)sends a broker IMI, message delivery/read acknowledgement and signs it with K1.

[0048] The message broker checks the outer digest generated by the ~~destination~~instant message gateway (receiver) with the key K1, checks the returned ID by comparing it with its own (stored) previously generated ID sent to the ~~destination~~instant message gateway (receiver), processes the acknowledgement, terminates the transaction and returns the acknowledgement to the ~~destination~~instant message gateway (receiver).

[0049] The instant message meta information integrity and origin is assured by the generation of the meta information inner digest ID (by using the message broker key K2) and the comparison with the inner digest ID received from the ~~destination~~instant message gateway (receiver).

Therefore the message broker can positively control the proper transmission of the inner digest ID from the sending gateway to the ~~destination~~instant message gateway (receiver). Furthermore it can be assured that no communication between the sending gateway and the ~~destination~~instant message gateway (receiver) is possible without intervention of the message broker.

[0050] As shown in Fig. 5D, the ~~The~~ message broker then sends a TSCS login key for a communication set-up to the ~~originator~~instant message gateway (originator).

[0051] The ~~originator~~instant message gateway (originator) checks the digest, processes the acknowledgement, notifies the sending client and returns an acknowledgement to the message broker.

[0052] The message broker than transmits a transmission message delivery acknowledgement signed with K1 to the ~~originator~~instant message gateway (originator).

[0053] The ~~originator~~instant message gateway (originator) checks the TSCS login co-key and returns a TSCS acknowledgement key containing the session key to the ~~instant~~ message broker.

[0054] The invention, therefore, provides a technique for (nearly) real-time capital flow control of direct messaging in a distributed messaging system.

[0055] The purpose of instant messaging is to transmit high priority messages in (nearly) real-time between clients (man and machine). Unified messaging merges analog and digital

transmitted messages such as facsimile, voice mail, e-mail, WWW and the cell phone short message service (GSM/SMS) to unified instant messages. A Unified Instant Messaging System (UIMS) is a (global) distributed system that consists of four major components that communicate with each other over an IP network: distributed gateways, message processors message brokers and a client directory database. Messages of arbitrary form are converted into Unified Instant Messages by the Instant Message Gateways and vice versa. The ~~Instant~~ Message Brokers (MB)~~(IMB)~~ controls the message flow, accounting and message conversion Additionally message brokers must ensure the authentication and security of instant messages to prevent the distributed system from ~~unauthorised~~ unauthorized access.

[0056] The present invention is an efficient data transmission protocol for the transmission of messages in nearly real-time. In an UIMS a relatively small number of message brokers manages the message transfer, processing and security. Thus, the communication protocol and unified message structure is ~~optimised~~ optimized for high message throughput and a minimum broker load. Instead of complete message transmission and processing, ~~IMBs~~ MBs process ~~processes~~ message meta information.